Bruggemann, Troy Sterling

BEng QUT, MEng QUT

Thesis Title:
Investigation of MEMS Inertial Sensors and Aircraft Dynamic Models in Global Positioning System Integrity Monitoring for Approaches with Vertical Guidance

Supervisors:
Prof Rod Walker (Principal)
Ass. Prof Yanming Feng (Associate)

Citation:
This thesis makes a significant contribution towards one of the challenging issues facing general aviation navigation today, which is how to improve the reliability of GPS-based vertically-guided landings. New aircraft-based augmentation approaches are proposed which fuse GPS with inertial sensors and dynamic models at the aircraft, and exploit this added information through special fusion techniques. Extensive studies of key navigation integrity parameters show that significant improvements could be attained with these techniques, which unlike current satellite or ground-based augmentation systems, are self-contained onboard the aircraft. These techniques could lead to improved safety and cost savings for the general aviation sector, due to less risk of controlled flight into terrain occurring on approach to landing in poor visibility conditions. This thesis is an outcome of an ARC linkage with industry grant (industry partners Airservices Australia, and GPSat Systems Australia Ptd Ltd).